DE 14-304

Wilson Engineering Services, PC
902 Market Street
Meadville, PA 16335
Office: (814) 337-8223

WES
Energy · Environment · Enterprise

October 17, 2014

Deborah A. Howland
Executive Director
New Hampshire Public Utilities Commission
21 South Fruit Street, Suite 10
Concord, NH 03301-2429

Re: MVSD 4 – Canaan Elementary School Thermal REC Application

Dear Ms. Howland,

Enclosed is Mascoma Valley School District's (MVSD) application for Renewable Energy Source eligibility for the Canaan Elementary School. This facility completed its installation in late 2013, and is in the process of putting the metering protocol in place to meet the metering rules as per PUC 2506. This is being submitted along with 3 other school facilities by MVSD.

This application is for qualifying the facility through an Interim Alternative Metering Method for the period from January 1, 2014 through when the period for use of the Interim Method expires. MVSD will be submitting a revised application once the ultimate metering protocol is in place.

WES thanks the PUC staff for all their efforts in making the Thermal RECs in NH a reality, and is pleased to submit this application. Please do not hesitate to call either MVSD or me with any questions or clarifications on the application.

Sincerely,

Wilson Engineering Services, PC

Daniel A. Wilson, P.E
Vice President

Attachments:

- MVSD 4 – Canaan Elementary School Thermal REC Application

State of New Hampshire
Public Utilities Commission
21 S. Fruit Street, Suite 10, Concord, NH 03301-2429

DRAFT

APPLICATION FORM FOR

RENEWABLE ENERGY SOURCE ELIGIBILITY FOR CLASS I THERMAL SOURCES WITH RENEWABLE THERMAL ENERGY CAPACITY GREATER THAN 150,000 BTU/HR

Pursuant to New Hampshire Administrative Code PUC 2500 Rules

- Please submit one (1) original and two (2) paper copies of the completed application and cover letter* to:

Debra A. Howland
Executive Director
New Hampshire Public Utilities Commission
21 South Fruit Street, Suite 10
Concord, NH 03301-2429

- Send an electronic version of the completed application and the cover letter electronically to executive.director@puc.nh.gov.

* The cover letter must include complete contact information and identify the renewable energy class for which the applicant seeks eligibility. Pursuant to PUC 2505.01, the Commission is required to render a decision on an application within 45 days of receiving a completed application.

If you have any questions please contact Barbara Bernstein at (603) 271-6011 or Barbara.Bernstein@puc.nh.gov.

Only facilities that began operation after January 1, 2013 are eligible.

Is this facility part of a Commission approved aggregation?
Yes X No
Aggregator's Company Name: WES Energy & Environment, LLC
Aggregator Contact Information: 902 Market St. Meadville, PA 16335
814-337-8223

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Attachment Labeling Instructions

Please label all attachments by Part and Question number to which they apply (e.g. Part 3-7). For electronic submission, name each attachment file using the Owner Name and Part and Question number (e.g. Pearson Part 3-7).

Part 1. General Application Information

Please provide the following information:

Applicant

Name: Mascoma Valley Regional School District SAU 62

Mailing Address: PO Box 789

Town/City: Enfield State: NH Zip Code: 03748

Primary Contact: Debra Ford

Telephone: 603-632-5563 Cell: 603-340-1101

Email Address: dford@mascoma.k12.nh.us

Facility

Name: Canaan Elementary School

Physical Address: 31 School Street

Town/City: Canaan State: NH Zip Code: 03741

If the facility does not have a physical address, the Latitude: _____ & Longitude _____

Installer

Name: Johnson Controls, Inc.

Installer License Number: n/a

Mailing Address: 116 Railroad Ave.

Town/City: Albany State: NY Zip Code: 12205

Primary Contact: John Sanborn

Telephone: _____ Cell: 518-894-8669

Email Address: john.b.sanborn@jci.com

If the equipment was installed by the facility owner, check here: ☐

Facility Operator

If the facility operator is different from the owner, please provide the following:

Name: Roger Hutchins

Facility Operator Telephone Number: 603-306-6281

Independent Monitor

Name: TBD via bid process, and winning bidders will be required to meet PUC requirements and be certified by the PUC

Mailing Address: _____

Town/City: _____ State: _____ Zip Code: _____

Primary Contact: _____

Telephone: _____ Cell: _____

Email Address: _____

NEPOOL/GIS Asset ID and Facility Code

In order to qualify your facility's thermal energy production for RECs, you must register with the NEPOOL – GIS. Contact information for the GIS administrator follows:

James Webb
Registry Administrator, APX Environmental Markets
224 Airport Parkway, Suite 600, San Jose, CA 95110
Office: 408.517.2174
jwebb@apx.com

Mr. Webb will assist you in obtaining a GIS facility code and an ISO-New England asset ID number.

GIS Facility Code # NON 43518 Asset ID # _____

1. Has the facility been certified under another non-federal jurisdiction's renewable portfolio standards?

Yes [ ] No [X]

If you selected yes, *please provide proof of certification in the form of an attached document as Attachment 1-1.*

2. Attach any supplementary documentation that will help in classification of the facility as Attachment 1-9

Part 2. Technology Specific Data

All Technologies

Fuel type (solar, geothermal, or biomass): Biomass

Rated Thermal Capacity (Btu/hr): 382000

Date of initial operation using renewable fuels: December, 2013

Biomass

If a thermal biomass facility, provide proof of New Hampshire Department of Environmental Services approval that the facility meets the emissions requirements set forth in Puc 2500, as Attachment 2-1.

Solar Thermal

If a solar thermal facility, please provide the Solar Rating and Certification Corporation rating based on Mildly Cloudy C (kBtu/day): _____

Geothermal

If a geothermal facility, please provide the following:

The coefficient of performance (COP): _____

The energy efficiency ratio of the system: _____

Part 3. Metering and Measurement of Thermal Energy and REC Calculations

This section deals with the thermal metering system including methods for calculation and reporting useful thermal energy. **A copy of PUC 2506.04 of the RPS rules is included as Appendix A.**

Using the table below, identify the thermal metering system or custom components (e.g., heat meters, flow meters, pressure and temperature sensors) used to measure the useful thermal energy and enter the accuracy of measurement for the entire system:

System or Component	Product name	Product Manufacturer	Model No.
Total System Accuracy (Percent)			

Attach component specification sheets (Accuracy, Operating Ranges) as Attachment 3-1. ☐

Attach a simple schematic identifying the location of each sensor that is part of the metering system as Attachment 3-2. ☐

Check the applicable standard for meter accuracy prescribed in Puc 2506.04 among the six choices below (compliance with Puc 2506.04 shall be certified by a professional engineer licensed by the state of New Hampshire and in good standing):

If the facility is a large thermal source using a liquid or air based system, check the method that applies:

A. Installation and use of heat meters capable of meeting the accuracy provisions of European Standard EN 1434 published by CEN, the European Committee for Standardization. The heat meter shall have the highest Class flow meter that will cover the design flow range at the point of measurement and a temperature sensor pair of Class 5K or lower. ☐

B. Installation and use of meters that do not comply with European Standard EN 1434, provided that the manufacturers' guaranteed accuracy of the meters is ±5.0% or better, ☐

C. Use of an alternative metering method approved pursuant to Puc 2506.06. ☐

If the facility is a large thermal source using a steam-based system, check the method that applies:

D. Installation and use of meters with accuracy of ±3.0% or better. ☐

E. Installation and use of meters with system accuracy that do not meet D but are ±5% or better. ☐

F. Use of an alternative metering method approved pursuant to Puc 2506.06. ☐

Please summarize the manufacturer's recommended methods and frequency for metering system calibration and provide reference for source document (e.g. owners/operators manual):

☐

REC Calculation Discount factor for meter accuracy (Enter 0 if no discount is required): _____ %

If the meters used to measure useful thermal energy comply with the accuracy of the European Standard EN 1434 for liquid systems or use of meters with accuracy of ±3.0% or better for steam systems enter zero, for all other systems enter the sum total of the manufacturer's guaranteed accuracy of the meters used or the accuracy of the alternative method approved pursuant to Puc 2506.06.

REC Calculation Discount factor for operating energy and thermal energy losses: _____ %

Check the method used for determining the operating energy and thermal loss factor among the choices below:

Default Factor ☐

- For sources using solar thermal technology, the discount factor shall be 3.0% of the useful thermal energy produced;
- For sources using geothermal technology, the discount factor shall be 3.6% of the useful thermal energy produced;
- For sources using thermal biomass renewable energy technology, the discount factor shall be

2.0% of the useful thermal energy produced.

Actual Metering ☐

- Include a simple schematic identifying the operating energy and thermal energy losses and placement of the meters.

Interim Alternative Metering Method

Until such time as the Puc 2500 rule is finalized applicants may utilize an alternative method as described in the draft rule 2505.02(e)(2):

In lieu of the information required by Puc 2505.02 (d) (11) through (13), a thermal source may submit a detailed explanation of the methodology used to measure and calculate thermal energy and an attestation by a professional engineer that is licensed in New Hampshire and in good standing that the methodology for measuring useful thermal energy and calculating certificates is sound.

See Attachment 3

Part 4. Affidavits

Owners Affidavit

The following affidavit must be completed by the owner attesting to the accuracy of the contents of the application pursuant to PUC 2505.02 (b) (14).

AFFIDAVIT

I, Debra Ford have reviewed the contents of this application and attest that it is accurate and is signed ~~under the pains and penalties~~ of perjury.

Applicant's Signature _____ Date 10/20/14

Applicant's Printed Name Debra Ford

Subscribed and sworn before me this 20th Day of October (month) in the year 2014

County of Grafton State of New Hampshire

Danielle M Pushee

Notary Public/Justice of the Peace Seal

DANIELLE M. PUSHEE
Notary Public - New Hampshire
My Commission Expires August 24, 2016

My Commission Expires August 16, 2016

NH Professional Engineer Affidavit

AFFIDAVIT

I, Daniel Archer Wilson attest that this facility meets the requirements of the thermal REC eligibility requirements of Puc 2500, including the thermal metering and measurement methodologies and standards and REC calculation methodologies.

Professional Engineer's Signature _____ Date 10/13/14

Professional Engineer's Printed Name Daniel Archer Wilson

NH Professional Engineer License Number 13688

PE Stamp

STATE OF NEW HAMPSHIRE - PROFESSIONAL ENGINEER - DANIEL A. WILSON No. 13688 LICENSED

Attachment 2-1

The State of New Hampshire
DEPARTMENT OF ENVIRONMENTAL SERVICES

Thomas S. Burack, Commissioner

August 5, 2014

Debra A. Howland
Executive Director and Secretary
New Hampshire Public Utilities Commission
21 South Fruit Street, Suite 10
Concord, NH 03301-2429

Re: Recommended Certification as a Class I Thermal Renewable Energy Source
Mascoma School District (Mascoma)
Canaan and Enfield, NH

Dear Ms. Howland:

The New Hampshire Department of Environmental Services (DES) was contacted by Charles Niebling of Innovative Natural Resource Solutions on behalf of Mascoma School District (Mascoma) requesting certification of the wood pellet boilers located at Mascoma as a Class I thermal renewable energy source. DES recommends that the Public Utilities Commission (PUC) grant approval to Mascoma as a Class I thermal renewable energy source eligible to generate renewable energy certificates. A summary of the facility description, DES's review of best management practices (BMP) requirements, and a recommendation for approval are presented below.

Facility Description

Facility Name: Mascoma School District (Mascoma)
Facility Locations:

Indian River School, Canaan
Mascoma Valley Regional High School, Enfield
Canaan Elementary School
Enfield Village School, Enfield

Gross Nameplate Capacity:
80 kW or 273,000 BTU/hr x 3
56 kW or 191,000 BTU/hr x 5
Primary Fuel: wood pellets

Emissions

By definition, *"Thermal biomass renewable energy technologies"*, requires units rated less than 3 MMBtu/hr gross heat input to meet best management practices (BMP) as established by DES for

control of particulate matter (PM) and nitrogen oxides (NOx) emissions. DES herein establishes BMP as conducting boiler tune-ups annually and conducting combustion efficiency testing initially and annually demonstrating results equal to or greater than 99%.

BMP Confirmation

Test data for carbon monoxide (CO) and carbon dioxide (CO_2) concentrations in the exhaust gas were used to determine combustion efficiency using the following equation:

$CE(\%) = 100 \times CO_2 / (CO_2 + CO)$

Where:

CE = combustion efficiency

CO_2 = % by volume of carbon dioxide in the flue gas, and

CO = % by volume of carbon monoxide in the flue gas.

The results of the initial tests indicate that the combustion efficiency meets the required 99%. DES anticipates that Mascoma will be able to meet ongoing BMP annually.

Conclusion and Recommendation for Approval

DES believes that Mascoma currently meets, and annually will meet, the requirements to be certified as a Class I - New Biomass thermal renewable energy source. DES recommends that the PUC certify Mascoma as a Class I thermal renewable energy source eligible to generate thermal renewable energy certificates, on the condition that Mascoma annually demonstrates that BMP continue to be met.

If you have any questions, please contact me at joseph.fontaine@des.nh.gov or (603) 271-6794.

Sincerely

Joseph T. Fontaine
Trading Programs Manager
Air Resources Division

Wilson Engineering Services
902 Market Street
Meadville, PA 16335
Office: (814) 337-8223

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ATTACHMENT 3

MEMORANDUM

Date: October 13, 2014

To: Deborah A. Howland, NH PUC

From: Dan Wilson, PE, Wilson Engineering Services, PC

CC:

Re: MVSD 4 – Interim Alternative Metering Method

The School has installed energy metering equipment that is being commissioned, and will be submitting the final protocol that meets the PUC requirements for use following the Interim period. However, in the interim period the School is proposing an Interim Alternative Metering approach, and this memorandum outlines the Interim approach.

The approach is based on measurement of the weight of fuel deliveries. This measurement is done by certified weigh scales, and the record is presented to the School. Additional variables are fuel higher heating value (HHV) and the HHV conversion efficiency of the installed biomass equipment. Equation 1 shows the proposed calculation for the system:

$Q = Qb * Eff * 0.98$ Equation 1

Where:

$Qb = Td * HHV$

Where:

- Q (Btu) is the total useful thermal energy generated by the facility.
- Qb (Btu) is the energy input to the system
- Eff (%) is the higher heating value conversion efficiency of the system
- Td (tons) is the tons delivered
- HHV (Btu/ton) is the energy value on a HHV basis of the fuel
- 0.98 is the factor to account for 2% loss from parasitic loads

The HHV of the fuel is stated by the manufacturer as 8,200 Btu/lb or 16.4 mmBtu/ton. Table 1 presents the efficiency test results for this boiler type conducted at a test laboratory. These are based on the EN 303-5 standard (direct method) using LHV. A value of 75% is used in Equation 1 for this system to ensure extreme conservatism in accounting for jacket/radiation losses and boiler cycling over time. This factor is also purposefully very conservative to ensure RECs are not overestimated due to potential inaccuracies associated with any other variables in the equation.

Table 1 – Efficiency Results from Manufacturer Test Data

Boiler	Boiler Efficiency at Nominal Heat Output (EN 303-5 , LHV)	Boiler Efficiency at Minimum Heat Output (EN 303-5, LHV)
1	93.6%	91.2%
2	93.6%	91.2%